

CLAIMS:

- 1 1. A method for detecting and compensating for color misregistration
2 comprising the steps of:
3 scanning one of a black/white edge and a solid color edge on a target;
4 generating a curve of gray values versus pixel spatial position for each color
5 channel on one of said black/white edge and said solid color edge scanned;
6 calculating a misregistration error by calculating an offset between color
7 channels; and
8 calibrating a unit using said calculated misregistration error.
- 1 2. The method as recited in claim 1 further comprising the step of:
2 storing said misregistration error.
- 1 3. The method as recited in claim 1, wherein said misregistration error is
2 calculated for said black/white edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:
5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the difference in gray values at a particular pixel
7 position between said first color channel and said second color channel; and
8 wherein diff2 is equal to the difference in gray values between neighboring
9 pixel positions in said first color channel.

1 9. The computer program product as recited in claim 6, wherein said
2 misregistration error is calculated for said solid color edge scanned on said target,
3 wherein said misregistration error between a first color channel and a second color
4 channel is equal to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the equation:

7
$$(\text{GV0C2} * \text{diffGVC1} / \text{diffGVC2}) - \text{GV0C1}$$

8 wherein GV0C2 is equal to the gray value at a particular pixel position
9 for said second color channel;

10 wherein diffGVC1 is equal to the difference in gray values between
11 neighboring pixel positions in said first color channel;

12 wherein diffGVC2 is equal to the difference in gray values between
13 neighboring pixel positions in said second color channel; and

14 wherein GV0C1 is equal to the gray value at a particular pixel position
15 for said first color channel; and

16 wherein diff2 is equal to the difference in gray values between neighboring
17 pixel positions in said second color channel.

1 10. The computer program product as recited in claim 6, wherein said
2 programming step of calculating said misregistration error comprises the
3 programming steps of:

4 fitting a second order curve to a plurality of data points on said curve of gray
5 values for a first and a second color channel; and

6 determining a lateral shift required to align one or more of said plurality of
7 data points for said first and said second color channel.

1 4. The method as recited in claim 1, wherein said misregistration error is
2 calculated for said solid color edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the equation:

7
$$(\text{GV0C2} * \text{diffGVC1} / \text{diffGVC2}) - \text{GV0C1}$$

8 wherein GV0C2 is equal to the gray value at a particular pixel position
9 for said second color channel;

10 wherein diffGVC1 is equal to the difference in gray values between
11 neighboring pixel positions in said first color channel;

12 wherein diffGVC2 is equal to the difference in gray values between
13 neighboring pixel positions in said second color channel; and

14 wherein GV0C1 is equal to the gray value at a particular pixel position
15 for said first color channel; and

16 wherein diff2 is equal to the difference in gray values between neighboring
17 pixel positions in said first color channel.

1 5. The method as recited in claim 1, wherein said step of calculating said
2 misregistration error comprises the steps of:

3 fitting a second order curve to a plurality of data points on said curve of gray
4 values for a first and a second color channel; and

5 determining a lateral shift required to align one or more of said plurality of
6 data points for said first and said second color channel.

1 6. A computer program product embodied in a machine readable medium for
2 detecting and compensating for color misregistration comprising the programming
3 steps of:

4 generating a curve of gray values versus pixel spatial position for each color
5 channel on one of a black/white edge and a solid color edge scanned on a target;

6 calculating a misregistration error by calculating an offset between color
7 channels; and

8 calibrating a unit using said calculated misregistration error.

1 7. The computer program product as recited in claim 6 further comprising the
2 programming step of:

3 storing said misregistration error.

1 8. The computer program product as recited in claim 6, wherein said
2 misregistration error is calculated for said black/white edge scanned on said target,
3 wherein said misregistration error between a first color channel and a second color
4 channel is equal to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the difference in gray values at a particular pixel
7 position between said first color channel and said second color channel; and

8 wherein diff2 is equal to the difference in gray values between neighboring
9 pixel positions in said first color channel.

1 11. A system, comprising:
2 a memory operable for storing a computer program for detecting and
3 compensating for color misregistration;
4 a processor coupled to said memory, wherein said processor, responsive to
5 said computer program, comprises:
6 circuitry operable for generating a curve of gray values versus pixel
7 spatial position for each color channel on one of a black/white edge and a solid color
8 edge scanned on a target;
9 circuitry operable for calculating a misregistration error by calculating
10 an offset between color channels; and
11 circuitry operable for calibrating a unit using said calculated
12 misregistration error.

1 12. The system as recited in claim 11, wherein said processor further comprises:
2 circuitry operable for storing said misregistration error.

1 13. The system as recited in claim 11, wherein said misregistration error is
2 calculated for said black/white edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the difference in gray values at a particular pixel
7 position between said first color channel and said second color channel; and

8 wherein diff2 is equal to the difference in gray values between neighboring
9 pixel positions in said first color channel.

1 14. The system as recited in claim 11, wherein said misregistration error is
2 calculated for said solid color edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the equation:

7
$$(\text{GV0C2} * \text{diffGVC1} / \text{diffGVC2}) - \text{GV0C1}$$

8 wherein GV0C2 is equal to the gray value at a particular pixel position
9 for said second color channel;

10 wherein diffGVC1 is equal to the difference in gray values between
11 neighboring pixel positions in said first color channel;

12 wherein diffGVC2 is equal to the difference in gray values between
13 neighboring pixel positions in said second color channel; and

14 wherein GV0C1 is equal to the gray value at a particular pixel position
15 for said first color channel; and

16 wherein diff2 is equal to the difference in gray values between neighboring
17 pixel positions in said first color channel.

1 15. The system as recited in claim 11, wherein said circuitry operable for
2 calculating said misregistration error comprises:

3 circuitry operable for fitting a second order curve to a plurality of data points
4 on said curve of gray values for a first and a second color channel; and

5 circuitry operable for determining a lateral shift required to align one or more
6 of said plurality of data points for said first and said second color channel.

1 16. A scanner, comprising:
2 a reading unit, wherein said reading unit comprises:
3 an illumination source configured to emit light onto a surface; and
4 a plurality of charge coupled device arrays configured to store electric
5 charge from light reflected from said surface;
6 a controller coupled to said reading unit, wherein said controller is configured
7 to sequentially activate said plurality of charge coupled device arrays, wherein said
8 controller is further configured to output said electrical charge stored in said plurality
9 of charge coupled device arrays as digital signals, wherein said controller comprises:
10 a memory operable for storing a computer program for detecting and
11 compensating for color misregistration; and
12 a processor coupled to said memory, wherein said processor,
13 responsive to said computer program, comprises:
14 circuitry operable for generating a curve of gray values versus
15 pixel spatial position for each color channel on one of a black/white edge and a solid
16 color edge scanned on a target;
17 circuitry operable for calculating a misregistration error by
18 calculating an offset between color channels; and
19 circuitry operable for calibrating said scanner using said
20 calculated misregistration error.

1 17. The system as recited in claim 16, wherein said processor further comprises:
2 circuitry operable for storing said misregistration error.

1 18. The system as recited in claim 16, wherein said misregistration error is
2 calculated for said black/white edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the difference in gray values at a particular pixel
7 position between said first color channel and said second color channel; and

8 wherein diff2 is equal to the difference in gray values between neighboring
9 pixel positions in said first color channel.

1 19. The system as recited in claim 16, wherein said misregistration error is
2 calculated for said solid color edge scanned on said target, wherein said
3 misregistration error between a first color channel and a second color channel is equal
4 to the equation:

5
$$\text{error} = \text{diff1} / \text{diff2}$$

6 wherein diff1 is equal to the equation:

7
$$(\text{GV0C2} * \text{diffGVC1} / \text{diffGVC2}) - \text{GV0C1}$$

8 wherein GV0C2 is equal to the gray value at a particular pixel position
9 for said second color channel;

10 wherein diffGVC1 is equal to the difference in gray values between
11 neighboring pixel positions in said first color channel;

12 wherein diffGVC2 is equal to the difference in gray values between
13 neighboring pixel positions in said second color channel; and

14 wherein GV0C1 is equal to the gray value at a particular pixel position
15 for said first color channel; and

16 wherein diff2 is equal to the difference in gray values between neighboring
17 pixel positions in said first color channel.

1 20. The system as recited in claim 16, wherein said circuitry operable for
2 calculating said misregistration error comprises:

3 circuitry operable for fitting a second order curve to a plurality of data points
4 on said curve of gray values for a first and a second color channel; and

5 circuitry operable for determining a lateral shift required to align one or more
6 of said plurality of data points for said first and said second color channel.